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TITLE : FERROELECTRIC THIN FILM ELEMENT AND ITS PRODUCTION

ABSTRACT : PURPOSE: To provide a ferroelectric element composed of a substrate and a ferroelectric thin film, wherein the substrate has a specific average thermal expansion coefficient between room temperature and the film-forming temperature of the ferroelectric thin film and the ferroelectric thin film is strongly orientated in a prescribed direction.

CONSTITUTION: A plasma is generated between a pair of parallelly arranged electrodes by high-frequency power in a vacuum chamber in the presence of a reactive gas such as oxygen. A raw material gas composed of an organic metal complex salt such as magnesium acetylacetonate is introduced into the plasma and decomposed. The decomposed gas is chemically deposited on a substrate having an average thermal expansion coefficient of $\geq 70 \times 10^{-7}/^{\circ}\text{C}$ between room temperature and the ferroelectric film formation temperature to form an intermediate layer such as an MgO thin film having an NaCl-type crystal structure oriented in $\langle 100 \rangle$ plane. This ferroelectric thin film element is produced by forming a tetragonal perovskite-type ferroelectric thin film having a composition expressed by $\text{PbLa}_{1-x}\text{Ti}_{1-x/4}\text{O}_3$ ($0 \leq x \leq 0.25$) and strongly oriented in $\langle 001 \rangle$ direction on the intermediate layer by a magnetron sputtering method using PbO , La_2O_3 , TiO_2 , etc., as a target.

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